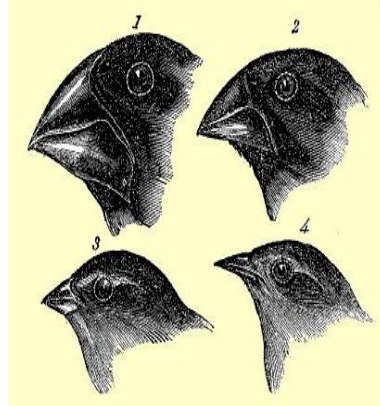


Finch Beak Lab

Background:

Charles Darwin observed in his journal that finches living on different Galapagos Islands had different beaks. He also observed that the environment on each of four islands was quite different from the environment on the other three islands; in particular, the type of food available to the finches was different on each island. He developed an hypothesis that the finches had all been the same at one time, (probably blown over from the coast of South America), with some variations in their beaks which made some beak types better adapted to the food on each island and so the birds with those beaks survived and reproduced and the others did not on that particular island with its particular type of food. We are going to perform a simulation experiment of what happened on each of the islands that resulted in the finches on each island having only one type of beak.

These are an example of four different types of beaks found in finches living in the four different islands.



Scientific Question:

How did the finches on each different island come to have different types of beaks?

Hypothesis:

Write a hypothesis explaining which beak type (tweezers, hairpin, clothespin, toothpick) would be best adapted to the food source on each of the four islands (A-D).

Materials:

Equipment for each 2 students:

- 1 paper plate (the feeding ground)

- 1 plastic cup (the stomach)

- 1 stopwatch

Food on the plate for one island

- Bird seed (Island A)

- Raisins (Island B)

- Rubber bands (Island C)

- Paper clips (Island D)

One of the following tools

- tweezers

- hairpin

- clothespin

- toothpick

Procedure:

In this lab there is a chain of 4 islands and each island only has 1 of 4 different types of food. The class will be divided into 4 islands (plates). Students work in teams of two. Each team represents the birds with one of the variations of beak found in the finches which blew over from the coast and therefore uses one of the tools which represent the variations of beak. There are four teams (eight students), each with different beaks (tool). Each island is represented by four identical feeding grounds (paper plates) containing one type of food. Plastic cups represent the bird stomachs.

Each team proceeds as follows:

1. Each team has one tool, a paper plate with the food available on that island, a paper cup and a stopwatch.
2. One member of the team uses the tool to pick up as much food as possible within 10 seconds and places it into the cup (stomach). The food cannot be touched. The plate and the cup can be held steady by the second team member.
3. After 10 seconds the team members switch places and repeat the feeding placing the additional food in the cup.
4. The team measures the amount of food in the cup and records it in the data table for *Generation 1*. The food is returned to the plate.
5. Use the hereditary rules to determine the number of birds with each beak in the next generation. (see example)

Heredity rules:

- *The bird with the smallest amount of food consumed is declared “starved to death without reproducing”.*
 - *The bird with the most food consumed is declared “thriving” and is rewarded with two children with the same beak.*
 - *The remaining two birds survive and have one child each with the same beak.*
6. Repeat the feeding event with each new generation until it is clear which type of beak (tool) will dominate on this island.

Data:

Use the Island Data Sheet provided for your islands individual data.

Class Data after 5 Generations:

Island	Food	Tool
A.		
B.		
C.		
D.		

Data Analysis:

1. Create a graph to show how the abundance of each beak type changed over 5 generations. Include a title, axis labels, and a key.
2. Using complete sentences describe how your beak type was most fit for the island you were assigned.
3. Use complete sentences to describe how variations in bird beak types affected survival of the birds. Use the key vocabulary natural selection, adaptation, and variation in your response.

Conclusion:

Write a conclusion based on the class data to answer the question: How did the finches on each different island come to have different types of beaks?=
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